CHAPTER VIII
SAFETY AND HEALTH IN THE SCRAP YARD

A. GENERAL

1. Purpose:

a. This safety and health guidance is for those DoD activities engaged in the assembling, sorting, processing, and distributing of scrap. The potential exists in the scrap yard for mishaps caused by faulty material handling procedures, exposures to hazardous material leaks and spills, tripping hazards, and unguarded machinery as well as injuries caused by flying fragments.

b. There is also potential for serious or traumatic injury whenever powered machinery such as alligator or guillotine shears, shredders, compactors, etc., are used.

c. A major health concern in the scrap yard is the torch-cutting or burning operations. Cutting or burning operations must always be carefully controlled so that workers are not overexposed to fumes. Mechanical exhaust, ventilation or respiratory protective devices may be required.

d. The material in this chapter is not intended to be inclusive of all safety and health requirements. Only those items providing a high mishap exposure situation in DoD scrap yards are mentioned.

e. A written Standard Operating Procedure **(SOP)** for emergency medical treatment must be available at each scrap yard for use in the event of an emergency.

2. A safe operation depends largely upon employees who are properly informed and aware of potential hazards. Training needs will vary according to the complexity of the operation. Establish health education programs to ensure that all employees who work with hazardous materials are notified of the hazards to which they are exposed; relevant symptoms and appropriate emergency treatment; precautions for safe use; and appropriate PPE and control devices. Suggestions are:

a. Impress upon the worker the need for constant awareness, even during automatically controlled operations.

b. Ensure that all employees know when and how to use appropriate PPE. Review potential physical and chemical exposures and the parts and functions of the body that could be impaired by such exposures.

c. Develop and maintain check points to be observed as a part of standard and emergency procedures.

d. Post appropriate warning signs and operating procedures.

e. Instruct employees in the use of fire fighting equipment.

f. Instruct employees in the use of emergency showers and eye wash equipment.

g. Have at least one *or* more persons trained in cardiopulmonary resuscitation (CPR) and first aid.

h. Be sure employees authorized to use motorized equipment are thoroughly instructed in its operation and potential hazards.

i. Develop a “good housekeeping” awareness to reduce accidents and to develop the employees’ sense of pride in their surroundings.

j. Instruct employees in safe lifting practices.

B. OCCUPATIONAL HEALTH, SAFETY AND ENVIRONMENTAL CONTROL

1. *Air Contaminants*

a. Employees may be exposed to fumes, dusts, gases, vapors, etc., resulting from various scrap processing operations such as torch-cutting, burning the covering off cables, and the breaking and salvage of batteries. When workers are exposed to excessive amounts of air contaminants, administrative or engineering controls must be considered first and implemented whenever feasible. When such controls are not feasible to achieve full compliance, protective equipment must be provided and used by employees who must be trained in its use.

b. Administrative controls limit the amount of time an individual is exposed to a health hazard during a particular operation by rotating workers. The primary method of engineering control is ventilation. After careful planning, design, and installation, the ventilation system should be checked and maintained on a regular basis.

2. *Metal Fumes and Dusts.* Fumes are very small particles formed by the vaporization of metal during torch-cutting or burning operations. Metal dust is generated by grinding. Special precautions, including the use of appropriate respira-

tory protection, need to be taken when cutting, burning, or grinding scrap containing alloys of more toxic metals, such as lead, zinc, cadmium, or beryllium.

a. Lead. Many processes involving the use of airborne lead require special precautions such as air monitoring and' medical surveillance. (See OSHA 1910.1025)

(1) Lead poisoning may occur through the inhalation and/or accidental ingestion of lead fumes or dusts. The symptoms of lead poisoning include loss of appetite, metallic taste in the mouth, anemia, headache, nervous irritability, muscle and joint pains, and abdominal cramps. Chronic lead poisoning is slow and vague in its beginning and the signs and symptoms are not well defined.

(2) Galvanized steel contains lead and zinc and should be torched with care to avoid unsafe fume exposures. Terne plate is steel plate coated' with an alloy of lead and tin. As a precaution, assume any paint on steel, applied as a protection against the weather or salt, contains lead.

(3) Good personal hygiene practices on the part of anyone working with lead should be stressed. Workers cutting or burning material containing lead should wash their hands thoroughly before eating. Lead contaminated gloves should be removed and hands washed before smoking. Eating must not be allowed in areas where lead cutting or burning is performed.

(4) The same hazards are present in the breakage and salvage of lead acid batteries. Care should be taken to limit worker exposure to lead fumes by exhaust ventilation methods or the use of respirators. Good personal hygiene practices should again be stressed.

b. Zinc, Excessive exposure to zinc oxide, resulting from inhalation of **fumes** due to the torch-cutting of zinc-containing alloys, such as galvanized steel, is the most frequent cause of an illness known as metal fume fever. This malady may also be known as zinc chills, shakes, or "Monday morning" fever. Metal fume fever may also follow excessive exposure to a number of metal fumes including iron, cadmium, copper, lead, or nickel. The symptoms are similar to those of influenza, and include a metallic taste in the mouth, dryness of nose and throat, weakness, fatigue, muscular and joint pain, fever, chills, and nausea. These symptoms usually last less than 24 hours and a temporary immunity follows.

c. Cadmium

(1) The brownish-yellow fume, cadmium oxide, produced when cutting cadmium-containing metals, can be an extremely hazardous health problem. This fume may, however, be masked by other metal fumes simultaneously given off. Cadmium-plated or alloy steel may look like zinc-coated steel.

(2) Excessive cadmium oxide exposure has no marked initial discomfort, however, acute symptoms occur a few hours later. These symptoms include: dry cough, irritation of throat and tightness of chest leading to difficulty in breathing, chest pains, and possible death from pulmonary edema.

d. Beryllium. A single excessive exposure to beryllium fumes may result in respiratory effects ranging from a mild inflammation of the nose and throat to a severe chemical pneumonitis, possibly resulting in death.

e. Other Metals. The fumes and dusts of cobalt, manganese and copper are also potentially toxic and employees' exposure must be limited to safe exposure levels by using adequate ventilation or respiratory protection.

3. Noise

a. Excessive noise can cause permanent hearing damage. Sources of noise in the scrap yard include shredders, certain cutting and shearing operations, conveyors, and heavy equipment motors or exhausts.

b. For an eight-hour exposure the standard limit is 85 decibels, A-weighted (dBA). The noise standard is a sliding scale, so exposure up to 4 hours to a sound level of 90 dBA, or 2 hours at 95 dBA are allowed if exposure during the remainder of the shift is less than 85 dBA. Even at these noise levels, hearing damage can be expected in some individuals. Preplacement, annual and termial audiograms will be conducted for all employees exposed routinely to noise levels at or over 85 dBA.

c. When employees are subject to sound levels exceeding the standard, feasible administrative controls (such as limiting time of exposure) or engineering controls (such as separation or isolation of noisy operations or using vibration dampening and acoustic materials) must be implemented. Mufflers on exhausts and proper lubrication of machinery will also reduce noise levels.

d. If administrative or *engineering* controls to reduce exposures to acceptable levels are not feasible, personal protective equipment must be provided and a continuing effective on-going hearing conservation program must be established.

e. A noise survey by adequately equipped and trained personnel should be made before implementing engineering and administrative controls, and/or setting up a hearing conservation program.

4. Other toxic and hazardous substances such as asbestos, caustics, flammables, etc., can also be found in the scrap yard (See OSHA 1910.1000).

C. PERSONAL PROTECTIVE EQUIPMENT (PPE)

1. *General.* PPE is not to be used as a substitute for feasible, administrative or engineering controls. If these control methods are not feasible, PPE is required whenever there are hazards that can do bodily harm through absorption, inhalation or physical contact. This equipment includes respiratory and protective hearing devices, clothing, and protective devices for eyes, face, head, and extremities. All PPE must be of safe design, constructed for the work to be performed and maintained in a sanitary and reliable condition.

2. *Protective Headwear.* A strict "hard hat" policy must be enforced whenever hazards from falling or flying objects may occur. The wearing of hard hats in potentially hazardous areas must become a habit, and management should set a good example and also insist they be worn. The headband should be adjusted for proper head protection, comfort, and to prevent falling off.

3. *Protective Eyewear and Face Shields. Eye* and face protection is required where there is a possibility of eye injury from flying particles, chips, caustic materials, etc. There is an obvious need for protection from sparks during operations *such as torch-cutting, but eye injuries* also *occur* during routine work such as operations involving hand tools, power tools, grinders, shears, and shredders. The appropriate type of eye protection (spectacle type safety glasses with side shields, goggles, and face shields) will depend on the situation encountered.

4., Gloves. When handling materials by hand, gloves will help prevent painful cuts, which are a more serious problem if they become infected. The type of glove selected should be based on exposure.

5. *Protective Footwear.* Protective footwear is required to prevent injuries resulting from punctures, and pinching or crushing caused by falling objects.

6. *Protective Clothing.* Protective clothing such as flameproof aprons, leggings, and gauntlet gloves may be needed as protection from the hazards created by cutting or welding operations. Chemical *resistant clothing* should be selected and used when there is likely to be an exposure to hazardous chemicals (i.e., cleaning up spills, leaks).

7. *Hearing Protection: See* paragraph B 3 d above.

8. *Respiratory Protection:*

a. National Institute of Occupational Safety and Health (NIOSH)—approved respirators will be provided when air is contaminated with excessive concentrations of harmful dusts, fumes, mists, gases, or vapors. Respirators are acceptable only when engineering or administrative controls are not feasible or while they are being implemented.

b. When respirators are needed, a written respiratory protection program must be established governing the selection and use of respirators. The program must include the following requirements:

(1) Selection: Respirators must be selected which are designed and approved for protection against the specific hazards to which the worker is exposed. For example, a dust and mist respirator will not normally provide protection from paints and solvents which evolve vapors.

(2) Medical Exams: An employee must be *examined* by a *doctor* to *certify* that the *worker is* physically able to wear a respirator.

(a) The doctor should be fully informed of the job and its exertion. Tests such as lung function x-rays, or others may be necessary in certain cases to make an accurate assessment.

(b) Heart or lung problems may limit or preclude the wearing of respirators.

(3) Training: Employees must be trained in the uses of respirators, their limitations, proper fitting and maintenance.

(a) Everyone's face is different. Several varieties of selected types should be available to ensure a proper fit.

(b) Instructions must include how to do fit tests for an air purifying (canister-cartridge) respirator. Plug up the filters in the respirator and breathe in gently. If the mask does not hold a vacuum, then it is not a good fit. Beards, sideburns, and/or glasses may interfere with a good face seal.

(c) Respirators and their, parts have a limited life. Cartridges must be replaced after a specified lifetime or when vapor odors are noted in the mask. Dust masks, filters and cartridges must be replaced when breathing becomes difficult.

(d) Inspect the respirator after using. Defects such as weakened straps, cracked or broken seals and deteriorated rubber parts must be replaced. A respirator which is not pliable will not seal properly.

(4) Cleaning: Respirators should be cleaned at the end of each day's use. Washing with a mild detergent solution and rinsing thoroughly with clean water is a simple measure to control dirt and disease.

(5) Storage: Respirators must be stored in a clean and sanitary location. Each employee should store his respirator in a particular location to avoid mixing them. Sharing respirators is not a recommended practice.

D. MATERIAL HANDLING EQUIPMENT

1. *Forklifts.* Forklifts are classified into categories for the purpose of determining what type of forklift may be used in certain locations. The type of hazard in a location determines whether diesel, electric, gasoline, or LP-gas powered forklifts may be used.

a. High-lift rider trucks must be fitted with an overhead guard to protect the operator from falling objects.

b. Methods must be developed and used to effectively train operators in the safe operation of forklifts, and only trained and authorized operators may operate the forklift.

c. When a forklift is left unattended (operator 25 feet or more away or lift not in view), the forks must be fully lowered, the control lever placed in neutral, the power shut off, and the brakes set. The wheels must be blocked if parked on an incline.

d. Forklifts must be inspected daily by the operator for any condition adversely affecting the safety of the vehicle before being placed in service. If the forklift is used for more than one shift, it must be inspected before each shift.

e. If the load being carried obstructs forward view, the operator is required to travel with the load trailing.

f. When unloading or loading from trucks, trailers, or rail cars with forklifts, provision must be made for securing the truck, trailer, or rail car by setting the brakes and placing wheel chocks under the rear wheels. Portable dock boards must be secured in position with devices which will prevent their slipping during loading and unloading.

2. *Cranes.* Although the guidance provided in this subparagraph pertains specifically to cranes, these requirements should be applied to all hoisting equipment.

a. All new cranes constructed and installed or in use on or after August 31, 1971, must meet the design specification of the American National Standard Institute Standards. Cranes constructed prior to that date should be modified to conform to these design specifications, unless it can be shown the crane cannot feasibly or economically be altered and the crane substantially complies with the requirements.

b. Occupational Safety and Health Administration (OSHA) requirements also are applicable and are only highlighted below:

(1) Only qualified operators shall be permitted to operate a crane.

(2) Hoods, ropes, chains, brakes, and all functional operating mechanisms must be inspected daily for indications of damage or excessive wear.

(3) Written and signed inspection reports must be made monthly on critical items such as brakes, hooks, and ropes and must be readily available.

(4) The hoist chain or rope must be free of kinks or twists and must not be wrapped around the load.

(5) Loads must not be carried over the heads of people.

(6) The operator must not leave his position at the controls while the load is suspended.

(7) All cranes using a lifting magnet must have a switch in the magnet circuit with provision for locking the switch in the open position.

(8) When the hook is in the extreme low position at least two complete wraps of cable must remain on the drum and the ends must be securely attached to the drum.

(9) A substantial and durable load rating chart with clearly legible letters and figures must be securely fixed in a location easily visible by the operator while seated at the controls.

(10) Hand signal charts will be posted so as to be clearly visible by the operator.

(11) The minimum clearance of 10 feet must be maintained between any part of a crane and any energized wires or any wire when the status is unknown.

3. *Slings*

a. Each day, before use, slings and all fastenings and attachments must be inspected.

b. The following safe practices must be used whenever using a sling

(1) Damaged or defective slings must not be used.

(2) Slings must not be shortened with knots, bolts, or other makeshift devices.

(3) Sling legs must not be kinked.

(4) Slings must be padded or protected from the sharp edges of their loads.

E. MACHINERY AND MACHINE GUARDING

1. *General*

a. One or more methods of machine guarding must be provided to protect the operator and other employees in the machine area from haz-

ards, such as point of operation, in-running nip points, rotating parts, flying chips, and sparks. All such hazards located seven feet or less above the ground, floor, or working platform, must be guarded. Machines designed for fixed locations must be securely anchored to prevent "(walking" or tipping.

b. The most common methods of guarding against a hazard or hazardous machine operation are:

(1) Enclose the operation (preferred)
(2) Interlocking devices
(3) Moving barriers
(4) Removal devices
(5) Remote control
(6) Two-hand tripping devices
(7) Electronic safety devices

2. *Alligator Shears and Notchers (Metal Scrap)*

a. A guard must be provided at the point of operation to prevent the employee from inserting hands into the area of operation. Employees should be trained by supervisors or other experienced personnel in the techniques of handling small parts in holding tools and in the manipulation of the shear's controls.

b. Blades must be kept sharp to facilitate the cutting process rather than having. the material being broken or shredded.

c. The operator and others in the vicinity must wear protective goggles or face shields as a protection against flying fragments.

d. On foot-operated hydraulic shears, the pedal should have a protective guard to prevent unplanned operation caused by falling objects or someone accidentally stepping on it.

e. A hold-down device at the in-feed side should be provided, capable of restraining the material from being forced upward during the shearing stroke.

3. *Guillotine Shears (Metal Scrap)*

a. The operator should have all auxiliary personnel clearly within his view at all times.

b. All affected workers in the shearing area must be protected by curtains or deflectors capable of intercepting ejected parts, or the area should be roped or fenced off or otherwise restricted to worker entry.

c. -Hand-fed or conveyor-fed guillotine shears should have an electrical interlock-type gate that will exclude personnel from the point of operation by preventing the shear's operation until the gate is closed.

4. *Shredders (Metal and Paper Scrap)*

a. When shredders that may throw random pieces of material back toward the inlet opening are used, flexible shields should be installed as a protection for loaders or passersby. Alternatively the hazardous area could be roped or fenced off to restrict entry.

b. Warning signs should be posted.

c. Where conveyors are used to load the shredder, there should be "STOP" controls within easy and quick access to employees working on the line.

5. *Compactors and Balers (Metal and Paper Scrap).* All balers or scrap-compressing equipment must be guarded so that the ram or compacting device cannot be activated until workers are out of the danger area. On paper balers, where the scrap is put into a pit prior to compression, an interlocking device which will allow operation of the ram only after the loading gates are closed and in place should be used. On large metal compactors the operator must have a clear unobstructed view of the loading, compacting, and unloading areas to be sure all personnel are safely clear of the operating area.

6. *Grinders*

a. Safety wheel guards must cover the spindle end, nut and flange projections. The exposed area of the grinding wheel and sides for the safety guards should not exceed more than one-fourth of the entire wheel.

b. Work or tool rests must be of strong construction and designed to be adjustable to compensate for wheel wear. Work rests must be closely adjusted to the wheel, with a maximum clearance of one-eighth inch.

c. Tongue guards must be constructed so that the tongue guard can be adjusted to the constantly decreasing diameter of the wheel. The distance between the tongue guard and the wheel must never be more than one-fourth inch.

d. Goggles or a face shield must be worn by the operator.

F. TORCH-CUTTING

1. *General*

a. Management must establish areas for torch-cutting based on the fire potential of the work area. Preferably, cutting should be done in an area with no surrounding combustible materials. Suitable fire extinguishing equipment must be maintained for instant use if combustibles are in the area.

b. Torch-cutters must be suitably trained in the safe operation of their equipment.

c. No cutting or other hot work shall be performed on used drums, barrels, tanks, or other containers until they have been cleaned so thoroughly as to make absolutely certain there are no

flammable materials present or other materials which, when subjected to heat, might produce flammable or toxic vapors.

d. Goggles or suitable eye protection must be worn during cutting operations.

e. Workers adjacent to the cutting areas must be protected by wearing appropriate goggles.

f. Employees exposed to hazards created by cutting must be protected by PPE such as flame-proof gauntlet, aprons, and fire resistant leggings or high boots.

2. *Ventilation and Respirators*

a. There are specific requirements concerning ventilation and respirators when cutting is performed on the following materials

(1) Stainless steel, lead, zinc, or cadmium.

(2) Metals coated with lead or mercury-containing materials such as paint.

(3) Fluxes or other materials containing fluorides.

TABLE VIII-1.—REQUIREMENTS FOR VENTILATION AND RESPIRATORS

Material	Confined Spaces	Indoors	outdoors
Lead	A or B	A	C
Zinc	A or B	A	
Cadmium*	A or B	Aor B	C
Beryllium*	A and B	A and B	A and B
Mercury*	A or B	Aor B	C
Fluorine*	A or B		
Stainless Steels	A	A	A

"Unless atmospheric testa under the most adverse conditions have established that workers' exposures are within acceptable concentrations defined by 29 Code of Federal Regulations (cm) 1910.1000.

A= Mechanical local exhaust ventilation by means of either hoods or booths with sufficient airflow to maintain a velocity, away from the worker, of at least 100 linear feet per minute.

B= NIOSH approved supplied air respirator.

C= NIOSH approved respiratory protective equipment.

b. Mechanical ventilation must be provided when cutting is done on metals not covered in the table above when:

(1) There is less than 10,000 cubic feet volume per cutter.

(2) The ceiling is less than 16 feet high.

(3) Work must be performed in confined spaces.

c. Such mechanical ventilation must be at the minimum rate of 2,000 cubic feet per minute per cutter, unless hoods or booths are provided with sufficient airflow to maintain a velocity (away from the worker) of at least 100 linear feet per minute. Alternatively, NIOSH approved supplied air respirators must be used.

G. DEMILITARIZATION

Munitions List Items will be demilitarized in accordance with policy and procedures set forth in DoD 4160.21-M-1, Defense Demilitarization Manual.

H. ENVIRONMENTAL CONSIDERATIONS

For DPDS activities, guidance on personal property requiring special environmental considerations ia contained in internal Service/Agency publications.